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14. ABSTRACT: The goal of this project is to encourage undergraduates to enter careers in prostate cancer research. This project involves BCM faculty presentations at Prairie View A & M University and a 9 week summer prostate cancer research experience at BCM for up to 5 undergraduates/year from PVAMU (3 in 2006; 4 in 2007 and 2008). Participants attended a weekly research discussion group focused on prostate cancer. Students make PowerPoint presentations on their work at the end of the program. The participants are co-registered in the SMART Program at Baylor College of Medicine (www.bcm.tmc.edu/smart) and have access to elements of the SMART Program including a interdisciplinary seminar series, career development activities and career counseling and the SMART GRE Prep Course. All of the four students in the 2008 program gained laboratory skills and learned more about biomedical research, especially prostate cancer research. Students made a total of 12 research presentations (two at national meetings). One student's work provided evidence that CD14+monocytes differentiate to myofibroblast reactive stroma that correlates with prostate cancer. One student won a 1st place research award for her study that identified peptides that might become good antigens for creating a prostate tumor vaccine.					
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INTRODUCTION:

The goal of this project is to encourage undergraduates to enter careers in prostate cancer research through emphasizing the importance of this health problem and generating excitement regarding opportunities to understand the disease and develop effective treatment. This project involves BCM faculty seminar presentations at Prairie View A & M University and a 9 week summer mentored prostate cancer research experience at BCM for 5 undergraduates/year from PVAMU. Students work at the forefront of research, often using high tech equipment, not typically available on undergraduate campuses. Participants attend a weekly research discussion group focused on prostate cancer that will provide opportunities to become better acquainted with prostate cancer researchers from Ph.D. students to faculty. Students make PowerPoint presentations on their work at the end of the program. The participants are co-registered in the SMART Program at Baylor College of Medicine (www.bcm.tmc.edu/smart). They have access to all elements of the SMART Program including a unique interdisciplinary seminar series that included an additional 8 seminars with a cancer focus, career development activities and career counseling. Participants enroll in the SMART GRE Prep Course. Social activities and dormitory housing near the Texas Medical Center facilitate interaction with approximately 70 other participants in the SMART Program who will learn about prostate cancer research from the participants funded by this proposal, amplifying the impact of the project.

BODY:

Dr. Gloria RegisFord organized opportunities at PVAMU for BCM faculty to present seminars on prostate cancer. She also organized educational workshops at PVAMU to help recruit participants and extend knowledge of the project beyond the PVAMU students who participate in the SMART Program. Dr. RegisFord has helped promote the program to individual students and provided valuable advice on working with the students. Dr. Weigel and Dr. Slaughter have presented talks and workshops at PVAMU (three times and four times, respectively, since the grant was funded). An African America Ph.D. student presented their prostate cancer research at each of Dr. Weigel's presentation. Dr. Slaughter met with PVAMU students on field trips to BCM. Dr. Weigel arranged weekly presentations on prostate cancer for the DOD participants and any other interested SMART Program participants, minority post-baccalaureate participants, Ph.D. students, or post-docs. Typically 6-10 people attended each session. Dr. Weigel identified potential mentors and she and Drs. Slaughter and Weigel matched students with mentors.

In 2008, four PVAMU students participated in the research and educational activities of the SMART Program. They wrote abstracts and presented 20-minute talks on their research for other SMART Program participants and lab members. All four students presented posters at the PVAMU Annual Biology Research Symposium. Sharmeka Elliot won 1st place for her poster. Two participants presented posters at national meetings and two others at the Texas A & M University Pathway Symposium. Each student presented three talks or posters to a total of approximately 100 people, mostly African Americans.

All four of the PVAMU students that we offered positions for the 2009 program have accepted, including one who won two awards at national meetings for previous research with Dr. RegisFord. We have two alternates.

KEY RESEARCH ACCOMPLISHMENTS:

Jovan Brown

- found that when CD14+ monocytes (labeled with a vital red dye) were co-cultured with prostate epithelial cells (expressing green fluorescent protein), after 5 days the spindle shaped fibroblasts cells were labeled with the red dye, indicating the fibroblasts were derived from the monocytes not epithelial cells
- found a subpopulation of the fibroblasts stained positive for vimentin, a marker of reactive stroma
- showed that serum amyloid protein could inhibited differentiation of fibroblasts in athymic mice injected with LNCaP cells and matrigel supporting a collaborator's data

Sharmeka Elliot (won 1st prize at PVAMU Biology Research Symposium)

- used Western blotting to determine that 40,000 virus particles per cell allowed expression of a mutant of SHP-1 that inhibits dephosphorylation of tyrosine receptors, and that that level of virus did not decrease cell count
- identified two nine amino acid peptides of STEAP (six transmembrane epithelial antigen of the prostate) and PCSA (prostate stem cell antigen) that had potential antigenic properties based on binding to MHC-1 (major histocompatibility) class molecules
- began an inoculation of C57B/6 mice with the dendritic cells expressing the mutant SHP-1 and pulsed with the tumor peptides

REPORTABLE OUTCOMES:

Each year (2006-2008) the top research award at the PVAMU Biology Research Symposium has been won by a participant in this DOD project, indicating that we are recruiting students with high potential and that they have excellent research opportunities at BCM. Participants reported the highest two levels of learning from lab experiences and seminars, but it was the combination of activities that resulted in large to enormous gains overall. They considered their experience to be good to excellent. Two students reported that the experience enhanced their interest in conducting research in the future and another will participate in the 2009 DOD program. Faculty mentors reported that all students benefited from being in the program. All participants in this project have completed their Bachelor of Science degrees or are on schedule to do so by 2010. All intend to continue training in biomedical related fields.

2006 Participants

Elise Copeland completed a BS degree in December, 2006 and obtained a technician position at BCM, with help from Dr. Slaughter and a supportive letter from her DOD mentor, Dr. Weigel. Elise was supported on a NIH minority supplement to her mentor's grant. She participated in all of the 2007-2008 activities of BCM's NIH funded SMART PREP post-baccalaureate program to better prepare herself for graduate study. The program provided her with a tutor, which helped her significantly improve her grade in the molecular and cellular biology class. PREP staff, Dr. Laurie Connor and Dr. Slaughter, wrote Elise letters of recommendation that helped her gain entrance to a Masters of Public Health program in Dallas.

Theresa Okeyo-Owuor completed her BS degree and is attending prestigious Washington University as a Ph.D. student. She has passed all courses and her qualifying exam.

Josiah Onyenekwe completed his BS degree in August, 2007 and is working as a technician while he prepares to take the MCAT and GRE exams and apply for MD/Ph.D. and DO/Ph.D. programs.

2007 Participants

Alem Tewoldeberhan completed his BS degree and was accepted to the prestigious University of Texas at Southwestern Medical School. He expects to continue research during his medical training and credits the DOD program with providing him experience and encouragement to pursue this path.

Jerecia Watson will complete her undergraduate degree in 2009 and apply to medical school.

Mark Williams, II completed his BS degree and is working as a technician while he improves his MCAT score and applies to medical school. Mark was selected for significant PVAMU leadership responsibilities his senior year of college (Mr. PVAMU). He has a very strong interest in community involvement, now including education regarding prostate cancer.

2008 Participants

Arica Babineaux learned cell culture, immunocytochemistry, Western blot analysis and RT-PCR (reverse transcriptase polymerase chain reaction) techniques. She will complete her BS degree in 2009 and is currently applying for a post-baccalaureate program at BCM to better prepare to **apply to Ph.D. programs**, a goal that arose from her participation in this DOD sponsored program.

Jovan Brown plans to apply for medical school.

Sharmeka Elliot plans to apply for Pharmacy School, with an emphasis on cancer treatment.

Adenuga Gbadebo, Jr. will return to BCM funded by DOD for the summer of 2009 where his progress in learning cell culture, cell count analysis, SDS PAGE and Western blotting in the 2008 program will enable him to contribute to prostate cancer research.

BCM faculty have participated in **seven seminars and workshops organized by Dr. Gloria RegisFord at PVAMU since the 2006 DOD grant was awarded. African American Ph.D. students participated in four of the seminars.** Dr. Slaughter presented a workshop on making the most of undergraduate research experiences and a workshop on preparing for the GRE for students the 2006 and 2007 summer programs at PVAMU, leading to an increase in participants for the 2007 program. She will present a workshop on making the most of undergraduate experiences in the spring of 2009.

Participants report that they are talking about prostate cancer to from 5-10 family members, friends and classmates about prostate cancer in the first year following their participation in the program. They are encouraging older family members to be screened for signs of prostate cancer. One 2006 participant discussed prostate cancer with relatives in Africa.

Presentations

BCM Oral Presentations

Arica Babineaux and Dolores Lamb, Ph.D. To Enhance the Antiproliferative Activity of Vitamin D in Prostate Cancer for Both Chemoprevention and Treatment of Advanced Disease. SMART Program Research Day. July 24, 2007, Houston Texas.

Jovan J. Brown, David A. Barron, Steven J. Ressler Ph.D., and David Rowley Ph.D. Reactive Stroma are Potentially Derived from CD14+ Cells that Give Rise to Myofibroblasts in Prostate Cancer. SMART Program Research Day. July 24, 2007, Houston Texas.

Sharmeka Elliot and Jonathan Levitt, Ph.D. Progress in Developing a Prostate Cancer Vaccine SMART Program Research Day. July 24, 2007, Houston Texas. (Won 1st prize for this presentation)

Adenuga Gbadebo Jr. and Nancy Weigel, Ph.D. Vitamin D and Inhibition of Prostate Cancer Cell Growth. SMART Program Research Day. July 24, 2007, Houston Texas

PVAMU Presentations

Arica Babineaux and Dolores, Lamb, Ph.D. To Enhance the Antiproliferative Activity of Vitamin D in Prostate Cancer for Both Chemoprevention and Treatment of Advanced Disease. Prairie View A & M University Biology Research Symposium, October 10, 2008, Prairie View, TX.

Jovan J. Brown, David A. Barron, Steven J. Ressler Ph.D., and David Rowley Ph.D. Reactive Stroma are Potentially Derived from CD14+ Cells that Give Rise to Myofibroblasts in Prostate Cancer. Prairie View A & M University Biology Research Symposium, October 10, 2008, Prairie View, TX.

Sharmeka Elliot and Jonathan Levitt, Ph.D. Progress in Developing a Prostate Cancer Vaccine. Prairie View A & M University Biology Research Symposium, October 10, 2008, Prairie View, TX.

Adenuga Gbadebo Jr. and Nancy Weigel, Ph.D. Vitamin D and Inhibition of Prostate Cancer Cell Growth. Prairie View A & M University Biology Research Symposium, October 10, 2008, Prairie View, TX.

Sharmeka Elliot and Jonathan Levitt. *Progress in Developing a Prostate Cancer Vaccine*. Texas A & M Pathway Symposium. College Station, TX.

Adenuga Gbadebo, Jr. and Nancy Weigel, Ph.D. Vitamin D and Inhibition of Prostate Cancer Cell Growth. Texas A & M Pathway Symposium. College Station, TX.

National Presentations

Arica Babineaux, Josephine Addai, Mounia Louet, Ayesgul Sahin and Dolores Lamb. *To Enhance Antiproliferative Activity of Vitamin D in Prostate Cancer for Both Chemopreventative and Treatment of Advanced Disease.* Annual Biomedical Research Conference for Minority Students, November 8, 2008, Orlando , FL.

Jovan Brown, David Barron and David Rowley. *Reactive Stroma Are potentially Derived from Cd14 Cells that Give Rise to Myofibroblasts in Prostate Cancer.* Annual Biomedical Research Conference for Minority Students, November 8, 2008, Orland, FL.

CONCLUSION:

The award structure presented a challenge in terms of finding five students specifically interested in prostate cancer research from a single campus. We increased our recruitment for the third year of the program to four participants from three participants for the first and second year of the program. Two of the planned five 2008 participants failed to secure permission to work as permanent residents.

The four 2008 participants benefited from their exposure to a frontier level research environment and the seminars they attended on prostate cancer. All students gained research skills (primarily in molecular biology) and background that are helping them reach goals for advanced study.

This partnership program has increased the presence of BCM faculty at PVAMU and enhanced the confidence of PVAMU students in interacting with senior faculty from a research intensive environment. Dr. Slaughter has become well known to PVAMU students. Dr. Weigel is becoming more well known and the program has featured four African American BCM Ph.D. students in a PVAMU seminar series. PVAMU students are more likely to bring friends to the BCM booth at conferences to learn about prostate cancer research and our Initiative for Maximizing Student Diversity that has included more than 150 under-represented Ph.D. and MD/Ph.D. students, nearly 10 of whom have been involved in prostate cancer research. PVAMU students see the incredible success of the IMSD through which minority students have won more than 150 awards, including nearly 40 national fellowships.

The increased ties between PVAMU and BCM were a significant factor in securing PVAMU faculty support for and in successfully competing for a \$5 million NIH IRACDA (Institutional Research and Career Development Award) grant that involves post-doctoral fellows from BCM helping to develop/revise/teach courses at PVAMU and two other minority serving institutions in the Houston area. This project began in the fall of 2008 and will enhance opportunities for PVAMU students to become better prepared to enter Ph.D. programs.

REFERENCES

None at this time.